

## An Apparent Association of Mites (Acarina) with the Rock Barnacle, *Balanus*

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**Abstract:** An apparent association of an oribatoid mite, *Hygroribates marinus* (Banks), with rock barnacles (*Balanus*, spp.) is reported. The mites regularly hide in crevices of the barnacle shell plates. The occurrence of large encrustations of barnacles may favor the spread of these sluggishly moving, ovoviviparous mites.

While collecting Acarina in the littoral region of New York City and vicinity, I have found vast numbers of mites of the suborders Mesostigmata, Trombidiformes, and Sarcoptiformes (Oribatei), evidently restricted to the intertidal zone. All belong to families known to occur in this zone, though most such families consist mainly of terrestrial species. Exceptions to the rule of primarily terrestrial groups with one or a few littoral species are the Halacaridae (Trombidiformes), a truly marine, often pelagic assemblage, and the Ameronothridae (Oribatei), which, as currently defined, consists of two essentially Old World genera each with a small number of described species, which are intertidal or at least strictly littoral. One of the latter family I have found consistently in association with barnacles of the genus *Balanus* (*Balanus balanoides* (Linnaeus), *B. eburneus* Gould, and *B. crenatus* Brugière) in the New York City area. It is closely allied but not certainly identical to the mite described by Banks as *Nothrus marinus* (1896) (= *Hygroribates marinus* (Jacot), 1934). However, owing to the primitive state of knowledge of the ameronothroid genera and species, it can only be provisionally referred to *H. marinus*.

*H. marinus* was found by Banks on intertidal rock outcrops near Sea Cliff, Long Island, New York. Jacot (1934) rediscovered it in a number of restricted localities along the coast in the vicinity of New York City and near Greenwich, Connecticut, but no farther east. Grandjean (1947) reported what he considered to be this species on the coast of France (two other species are known in Eurasia). It has otherwise seldom been reported. All have found it confined to the surfaces of rough rocks, e.g., schist, coated with small algae, clinging to the surface in small fissures, or occasionally crawling over the rock or among the algae. Little is known of the life history or ecology of this or any others of the family Ameronothridae, except that they are ovoviviparous and that the immature stages are found in the same habitat. It has been pointed out (Jacot, 1934) that owing to the lack of an egg stage, dispersal by water currents is unlikely, as all stages appear to cling tenaciously to the substrate when submerged, and neither swim nor crawl far from convenient crevices.

I have rarely collected *H. marinus* on stones as such or in algae, though other mites, particularly Mesostigmata, and even Oribatei of the family Hermannidae are common. Instead, they do occur in numbers on the shells of *Balanus*, which encrust rocks in great numbers in the intertidal zone. The mites are invariably found clinging to the shells in the crevices between the mural and other shell plates, and in the vertical grooves of the plates themselves. I occasionally find individuals on the inside of the scutal or tergal plates which cover the living barnacle.

At high tide the barnacles are covered with water to a depth of 2 or 3 feet on some outcrops, and at low tide may be fully exposed for hours. Mites were observed to cling more or less quiescent during the hours of exposure, to become somewhat more active while the incoming tide covered them, and then to become relatively inactive again in the crevices after submergence. I was able to observe them to a depth of several inches. Collecting of barnacles from rocks at depths of up to approximately 2 feet revealed mites, which continued to seek crevices and become quiet after the disturbance jarred some from their hiding places.

Barnacles were kept alive for several days in the laboratory. During this time, mites were inactive by day. Though they were completely submerged during this time, since they do not swim and crawl only sluggishly, they remained alive and on the barnacles even after the latter died. I kept several individuals thus for 6 days. Death of the barnacles and consequent contamination of the water may have contributed to the eventual death of the mites.

No close symbiotic association of *Hygroribates* with *Balanus* is implied. It is suggested the encrustation of rocks with large colonies of barnacles provides a continuous habitat for the mites not furnished by bare, smooth rocks, and that therefore the loose association is advantageous for the spread of the mite. Studies are planned to learn more about the ecology of *H. marinus* and to review the systematics of the Ameronothridae.

#### Literature Cited

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